

Having described the invention, we claim:

1. A tube fitting for connection with a tube, said tube fitting comprising first and second flanged members and a ferrule between said first and second flanged members, said ferrule engaging said tube to form a tube grip and seal when said first and second flanged members are drawn together.
2. A tube fitting as set forth in claim 1 wherein said first and second flanged members are drawn together without relative rotation between said first and second flanged members.
3. A tube fitting as set forth in claim 1 wherein there is no threaded connection between said first and second flanged members.
4. A tube fitting as set forth in claim 1 further including a clamp for exerting radial force on said first and second flanged members to draw said first and second flanged members together.
5. A tube fitting as set forth in claim 4 wherein said first and second flanged members have respective non-parallel surfaces that are engaged by said clamp.
6. A tube fitting as set forth in claim 5 wherein said non-parallel surfaces are conical surfaces.
7. A tube fitting as set forth in claim 5 wherein said non-parallel surfaces are flat surfaces.
8. A tube fitting as set forth in claim 1 wherein said ferrule is axially driven by the first flanged member against the second flanged member to grip and seal against the tube without relative rotation between the first flanged member and the ferrule.
9. A tube fitting as set forth in claim 1 wherein said ferrule is formed as one piece with one of said first and second flanged members.
10. A tube fitting as set forth in claim 1 wherein said ferrule is a separate piece from said first and second flanged members.

11. A coupling apparatus for coupling to a tube having an axis and an end portion, said apparatus comprising:

a first coupling member to which the tube is to be joined in sealing engagement, the first coupling member having a tube socket for receiving the end portion of the tube, the first coupling member having a first surface;

a ferrule movable axially along the tube into engagement with the first coupling member;

a second coupling member movable axially along the tube for moving the ferrule into gripping engagement with the tube, the second coupling member having a second surface that is not parallel to the first surface; and

means engageable with the first and second surfaces for drawing the first and second coupling members together axially thereby to hold the ferrule against the first coupling member.

12. An apparatus as set forth in claim 11 wherein said means for drawing includes means for exerting radially inwardly directed force on the first and second surfaces.

13. An apparatus as set forth in claim 11 wherein said first and second surfaces are on first and second flanges, respectively, of said first and second coupling members.

14. An apparatus as set forth in claim 11 wherein said ferrule is axially driven by the second coupling member against the first coupling member to grip and seal against the tube without relative rotation between the first and second coupling members.

15. A tube fitting as set forth in claim 11 wherein said ferrule is formed as one piece with the second coupling member.

16. A tube fitting as set forth in claim 11 wherein said ferrule is a separate piece from said first and second coupling members.

17. Apparatus comprising:

a tube having an axis and an end portion;

a first coupling member to which the tube is to be joined in sealing engagement, said first coupling member having a tube socket for receiving the end portion of the tube;

a ferrule movable axially along the tube into engagement with said first coupling member;

a second coupling member; and

a tapered clamp for generating axial force between said first and second coupling members to move said ferrule into gripping engagement with the tube.

18. Apparatus as set forth in claim 17 wherein said tapered clamp generates axial force between said first and second coupling members without relative rotation between said first and second coupling members and said ferrule.

19. Apparatus as set forth in claim 18 wherein said tapered clamp comprises a member movable radially inward toward the axis to apply radial force to at least one surface that is not perpendicular to the axis thereby to cause axial force to be applied to said ferrule.

20. Apparatus as set forth in claim 19 wherein said first and second coupling members have first and second flange surfaces, respectively, that are not parallel to each other, said at least one surface being one of said first and second flange surfaces.

21. A tube fitting as set forth in claim 17 wherein said ferrule is formed as one piece with said second coupling member.

22. A tube fitting as set forth in claim 17 wherein said ferrule is a separate piece from said first and second coupling members.

23. A method comprising the steps of:

providing first and second flanged members on a tube;

providing a ferrule on the tube between the first and second flanged members; and

drawing the first and second flanged members together to cause the ferrule to engage the tube to form a tube grip and seal.

24. A method as set forth in claim 23 wherein said drawing step includes exerting radial force on two non-parallel surfaces on the first and second flanged members to draw the surfaces closer together axially.

25. A method as set forth in claim 23 wherein said step of providing a ferrule includes providing a ferrule that is formed as one piece with the first flanged member.

26. A method as set forth in claim 23 wherein said step of providing a ferrule includes providing a ferrule that is formed separately from the first and second flanged members.

27. A method as set forth in claim 23 further comprising the step of providing a second ferrule on the tube between the first and second flanged members.

28. A method comprising the steps of:

inserting an end portion of a tube into a tube socket in a first coupling member;

moving a ferrule along the tube into the tube socket and into engagement with the first coupling member; and

using a tapered clamp to exert axial force on the ferrule to cause the ferrule to grip and seal on the tube.

29. A method as set forth in claim 28 wherein said step of using a tapered clamp generates axial force between the ferrule and the first coupling member without relative rotation between the ferrule and the first coupling member.

30. A method as set forth in claim 29 wherein the tapered clamp comprises a member movable radially inward toward the axis to apply radial force to a surface on the first coupling member that is not perpendicular to the axis thereby to cause axial force to be applied to the ferrule.

31. A method as set forth in claim 29 wherein the first and second coupling members have first and second flange surfaces, respectively, that are not parallel to each other, the first flange surface being on the first coupling member, the second flange surface being on a second coupling member.

32. A method as set forth in claim 28 wherein the ferrule is formed as one piece with the first coupling member.

33. A method as set forth in claim 28 wherein the ferrule is formed separately from the first and second coupling members.